

11-4-2014

## The Transfer of Learning Associated with Audio Feedback on Written Work

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<http://dx.doi.org/10.5206/cjsotl-rcacea.2014.1.8>

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### Recommended Citation

Martini, Tanya and DiBattista, David (2014) "The Transfer of Learning Associated with Audio Feedback on Written Work," *The Canadian Journal for the Scholarship of Teaching and Learning*: Vol. 5: Iss. 1, Article 8.

DOI: <http://dx.doi.org/10.5206/cjsotl-rcacea.2014.1.8>

Available at: [http://ir.lib.uwo.ca/cjsotl\\_rcacea/vol5/iss1/8](http://ir.lib.uwo.ca/cjsotl_rcacea/vol5/iss1/8)

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# The Transfer of Learning Associated with Audio Feedback on Written Work

## Abstract

This study examined whether audio feedback provided to undergraduates (N=51) about one paper would prove beneficial in terms of improving their grades on another, unrelated paper of the same type. We examined this issue both in terms of student *beliefs* about learning transfer, as well as their *actual ability* to transfer what had been learned on one assignment to another, subsequent assignment. Results indicated that students believed that they would be able to transfer what they had learned via audio feedback. Moreover, results also suggested that students actually did generalize the overarching comments about content and structure made in the audio files to a subsequent paper, the content of which differed substantially from the initial one. Both students and teaching assistants demonstrated very favourable responses to this type of feedback, suggesting that it was both clear and comprehensive.

Cette étude examine la question de savoir si le feedback audio donné à des étudiants de premier cycle (N=51) concernant un travail écrit pouvait les aider à améliorer leur note pour un autre travail d'un autre ordre mais du même type. Nous avons examiné la question à la fois en termes des *croyances* des étudiants concernant le transfert des connaissances, ainsi qu'en termes de leur *capacité réelle* à transférer ce qu'ils avaient appris à propos d'un travail à un autre travail rédigé ultérieurement. Les résultats ont indiqué que les étudiants pensaient être capables de transférer ce qu'ils avaient appris par le biais d'un feedback audio. De plus, les résultats ont également indiqué que les étudiants avaient effectivement généralisé les commentaires principaux sur le fond et la forme présentés dans les fichiers audio et les avaient appliqués à un travail ultérieur dont le contenu était considérablement différent du premier. Tant les étudiants que les assistants enseignants ont fourni des réponses très favorables à ce type de feedback, suggérant que le tout était clair et compréhensible.

## Keywords

formative feedback

## Cover Page Footnote

Our thanks to Barry Joe for supporting this project.

Formative feedback provides students with information about how their work compares to expectations and about how to improve their work to bring it to the desired standard (Brown & Glover, 2005). Research has demonstrated that providing formative feedback is an important element of developing students' writing skills, but there is also consensus that it is a time-consuming process (Bailey & Garner, 2010; Ruiz-Primo & Li, 2013). At a time when markers have fewer hours to spend on student papers, it is important to find effective ways to provide students with comprehensive feedback while being mindful of time constraints.

One means of providing such feedback is through the use of audio recordings (Lunt & Curran, 2010; Rotherham, 2009). While older technology (i.e., cassette tapes) led to this method being perceived as cumbersome, newer digital technology has rendered it much more streamlined (Macgregor, Spiers, & Taylor, 2011). Now, markers record spoken comments using a digital recorder and the resultant files are emailed to students who download and listen to them at a convenient time. The recorded comments can supplement briefer comments made directly on the page, and may include areas of strength and weakness, as well as suggestions about how students can improve on their work in the future. In the present research, we examine whether audio feedback is effective in promoting the transfer of learning from one assignment to an unrelated assignment of the same type.

## **Previous Evaluations of Audio Feedback**

Past research has pointed to at least four advantages that are conferred through the use of audio feedback. First, researchers have noted that audio feedback may help to address the needs of students who prefer oral modalities, either because they have been diagnosed with a text-based learning disability (e.g., dyslexia) or because they are visually impaired (Merry & Orsmond, 2008). A second advantage of audio feedback is that it allows more information to be conveyed to students in the same amount of time; thus the level of detail provided in the comments is greater (Brearley & Cullen, 2012; Huang, 2002; Macgregor et al., 2011). Third, audio feedback appears to allow for higher quality comments that have "a level of nuance and specificity that is difficult or perhaps impossible to match with written comments" (Bilbro, Iluzada & Clark, 2013, p. 50). In other words, audio feedback allows instructors to better communicate and clarify their concerns, particularly those that are related to larger, overarching issues (e.g., the paper's organization and structure; Sommers, 1989). Finally, audio feedback appears to promote more positive relationships between instructors and students, largely because instructors feel that they are more engaged with their students (Anson, 1999) and students view this form of feedback as being more personal (Brearley & Cullen, 2012; Cryer & Kaikumba, 1987; Merry & Orsmond, 2008; Yarbrow & Angevine, 1982). Moreover, Ferguson (2011) has suggested that the personal nature of audio feedback results in students feeling that the comments they receive will be more helpful in terms of improving future work.

While there are clearly advantages inherent in the use of audio feedback, the issue of whether it is helpful in improving student learning is also of central importance. In a review of the literature, Bilbro et al. (2013) note that past studies have been somewhat inconclusive with respect to the question of whether audio feedback is superior to written feedback in this regard. Some authors have found that there is no material difference between the two types of formative feedback (Kirschner, van den Brink, & Meester, 1991), though many others have found audio feedback to be more positive (Brearley & Cullen, 2012; Rotherham, 2009). Ambiguities have also been found with regard to student preferences: While research suggests that many students

clearly prefer audio feedback to written comments (e.g., Lunt & Curran, 2010), studies have also occasionally reported results suggesting that there are students who prefer their comments in writing (Bilbro et al., 2013).

## **The Present Study**

In the present study, we did not seek to compare written and audio feedback. Instead, our starting point was the fact that most investigations of formative feedback (whether written or oral) have examined its ability to foster improvement on a revised version of the same paper. For many years, though, academics have noted the importance of *learning transfer*; that is, students' ability to take what has been learned in one context and apply it appropriately to another (Bransford & Schwartz, 2001). *Thus, the central purpose of this study was to extend existing research by examining whether primarily audio feedback (with minor written comments) about one paper would prove beneficial in terms of improving grades on another, unrelated paper of the same type.* We examined this issue both in terms of student beliefs about learning transfer, as well as their actual ability to transfer what had been learned on one assignment to another, subsequent assignment. With respect to *student beliefs about learning transfer*, we hypothesized that students would perceive that audio comments would be readily transferable to a similar type of paper on another topic, provided that comments were seen as sufficiently detailed and easy to understand. In terms of *actual learning transfer*, we expected that audio feedback on a preliminary assignment would yield significant improvements in marks on a subsequent unrelated writing assignment of the same type.

## **Method**

Audiorecorded feedback concerning a short paper was provided to a third-year undergraduate class in psychological research methods (N=51). For this assignment, students reviewed the scientific research in an area of their choosing, and identified a testable question that had not been addressed in the literature. Students then wrote a 2000-word introduction to a manuscript describing an empirical study that would address their research question (the "introduction short report"). Students did not re-write this paper based on the audio and written feedback that was provided to them. Instead, the feedback provided students with generalizable comments about the content, structure and writing style of their introduction short report, and these were intended to assist them in writing the introduction to a full manuscript (which also included method, results, and discussion sections) on a different topic later in the course (the "final paper").

Two teaching assistants (TAs) were asked to use audio feedback to discuss only the content and structure of the paper. However, the audio files often made reference to brief written comments on the paper that highlighted these same issues. Content-related comments centred on the extent to which relevant research had been reviewed, and students' ability to prioritize the literature in such a way that the studies that were central to the question being asked were reviewed in the greatest depth. Comments concerning the paper's structure were focused primarily on organization, including the creation of a logical argument and effective use of transitions between and within paragraphs. TAs were given one hour of marking time per paper, and this included the time required to create and email the audio file. No additional practice with this type of writing was provided between the introduction short report and the final paper.

In producing the MP3 audio files, TAs were asked to refer to specific locations in the paper (noted with the brief written comments) when providing feedback about what was done well, areas that could be improved, and examples of how problem areas could be enhanced. The audio files were between 5 and 7 minutes in length, which provided sufficient time for comments to be clearly articulated while keeping the digital files at a manageable size. Issues related to grammar and formatting were restricted to written comments that were made directly on the paper.

Forty-seven students (92%) completed an anonymous evaluation of the audio feedback. They were asked to answer four questions about their audio file, based on the findings of prior literature and our interest in understanding the utility of audio feedback in fostering transfer of learning. Because we believed that learning transfer would depend on both students' ability to understand the feedback and how comprehensive the comments were, we began by asking two questions that addressed these basic issues related to perceived quality of the feedback. These questions were: How easy was it to understand the TA's main points? and How detailed were the TA's comments?

The third question -- To what extent do you think that the audio feedback will be helpful in terms of improving your writing *on the next paper*? -- provided the information needed to address our first research question about students' beliefs concerning learning transfer. Each of the first three questions were answered on a scale from 1 (not at all) to 7 (very). The fourth question invited students to supply open-ended comments to further clarify their responses.

Teaching assistants were asked to comment on concerns that they had before making the audio recordings, aspects of marking and recording that were difficult initially but improved with practice, and ongoing concerns that were not alleviated with practice. Teaching assistants were also asked to indicate their opinions about audiorecorded feedback compared with written feedback that they had provided in other courses in terms of the time required, and the level of clarity and detail.

## Results

### Students' Assessment

Student responses were not correlated with the grade that they received on the paper, or with their grades in the course. Our first research question centred on students' perceptions of the utility of audio feedback with respect to learning transfer. In keeping with our expectations, findings suggested that students felt that audio feedback was detailed and easy to understand, and had significant potential in terms of learning transfer, that is, in assisting them with writing the introduction to the final paper (see Table 1).

In terms of actual learning transfer, we were interested in whether the feedback provided on the first assignment (introduction short report) would prove useful in improving the quality of writing on a subsequent similar assignment (introduction section of the final paper). Using the same grading criteria, analyses indicated that grades received on the introduction of the final paper ( $M = 15.9/20$ ) were significantly higher than those achieved on the introduction short report ( $M = 14.4/20$ ),  $t(49) = -3.35$ ,  $p = .002$ , which was consistent with our hypotheses.

Finally, qualitative data suggested that overall evaluations of the audio feedback were very favourable. Positive student comments focussed predominantly on the high level of specificity of the audio feedback, which allowed them to clearly understand both the strengths

and weaknesses of the paper. Students also appreciated the specific suggestions about how problem areas could be rewritten, and indicated that the feedback seemed more personal than written comments. One student indicated concerns that their feedback had been too vague and a second suggested that theirs had been disproportionately focused on a single issue.

Table 1  
*Student Responses Concerning Audio Feedback*

Question	Mean (1-7) SD	Range (1-7)	% of students rating 5 or higher
Easy to understand?	6.22 0.87	4-7	94
Detailed?	5.89 1.14	3-7	85
Helpful for improvement on next paper?	5.74 1.14	2-7	85

### **Teaching Assistants' Assessment**

Teaching assistants indicated that they initially needed considerable time to formulate what they would say to students, and that they were self-conscious and concerned about the audio files being 'perfect' (e.g., free of disfluencies, unexpected interruptions and background noise). However, with practice they became faster at distilling the points to be included on the audio recording and less concerned with producing a flawless file. Similar to prior findings (e.g., Dyer et al., 2011; Rotherham, 2009), teaching assistants in this course did not feel that there was an overall time savings achieved by using audio feedback, nor did they feel that the audio recordings led to a reduction in the number of students who wished to discuss their papers in person. However, the teaching assistants did report that the audio technique was superior to written feedback in that it allowed them to provide more detailed, personalized, and integrative feedback in the same amount of time.

### **Discussion**

The findings of this study support past research, demonstrating that audio recordings are a useful means of providing detailed formative feedback on students' written work and can promote learning transfer. Moreover, similar to prior literature (e.g., Rotherham, 2009), students' responses toward the audio feedback were very favourable, indicating that it was clear and detailed. The audio feedback was also perceived to be personal, a factor that has been associated with improved student-instructor relationships, as well as student beliefs that the feedback is more likely to be useful for improving future work (Ferguson, 2011).

The latter point is key to the central issue explored in this research; namely whether this type of formative feedback (primarily oral, with some more minor written comments) would be helpful in terms of transferring what has been learned about scientific writing to a similar, subsequent assignment. Our results support the effectiveness of this approach: Students in the

current sample indicated an expectation that the audio feedback they received for their short report would be helpful to them in writing the introduction to the final paper. Moreover, analyses indicated that they were correct, as marks on the introduction to the final paper were significantly higher than those obtained on the introduction short report. We believe that these findings are significant because they suggest that students were able to generalize the overarching comments about scientific writing (particularly content and structure) made in the audio files to a subsequent paper, the content of which differed substantially from the initial one.

Though our data suggest that audio feedback successfully fosters learning transfer, our findings also suggest that there was not necessarily any time savings. TAs continued to use the full allotment of time for grading these papers, though they suggested that they were able to provide more detailed feedback using the audio recordings than they could with written comments. This raises the question of whether there is anything inherently important about the audio medium itself, or whether the positive results that we observed simply suggest that TAs need more time to grade with an appropriate level of detail when providing written comments (since it is faster to speak than to write). Some past literature has suggested that the audio format is indeed important because students feel that this type of feedback is more personal, and that perception has been connected to positive student outcomes (Ferguson, 2011). However, a rigorous empirical test is needed to compare audio feedback with identical written feedback to establish whether there are differences on key learning outcomes. Should such a comparison demonstrate that is the amount of feedback rather than the medium that is important, it might be helpful for markers to consider the use of speech recognition software that would convert spoken comments into written text.

Extant literature and our own experience suggest that, to use audio feedback technique effectively, several overarching guidelines are important. First, the amount of feedback being provided via the audio should be restricted to a manageable number of issues to reduce the likelihood that students will feel that the instructor has a negative impression of them (Ackerman & Gross, 2010), or that they will be overwhelmed by the information provided. It's also important to refer to the specific places in the text to which the comments refer (Rodway-Dyer, Knight, & Dunne, 2011). From a logistic point of view, restricting the amount of feedback also alleviates concerns about the size of the resultant audio file, which may be an issue if the feedback is being emailed to students (Merry & Orsmond, 2008).

Second, the feedback should be balanced and provide students with feedback about what they have done well, as well as those areas that need improvement (Ferguson, 2011). Audio feedback may help in providing a more integrated perspective on positive and negative aspects of the paper, since it more easily allows the marker to identify multiple examples of common strengths and weaknesses that may be scattered throughout the paper.

Third, helping students to close the gap between current and desired performance may be enhanced when specific detailed suggestions are offered about how problematic areas can be improved (Rodway-Dyer et al., 2011). Again, the use of audio feedback may enhance the formative nature of such comments, as it is more time efficient to verbally offer a few alternative suggestions for improvement than it would be to write them down. Finally, if teaching assistants are engaged in the process of producing the audio feedback, then it may be helpful to be proactive about discussing some of the concerns that they are likely to have (e.g., the need to produce a 'perfect' recording).

## Limitations of the Present Study and Future Research

The present research was not intended to provide a direct comparison of the efficacy of written vs. audio feedback; as such, we recognize that the improvements in grades that we noted might also have been achieved if only written comments had been made on students' papers. Given the mixed results of prior studies that compare audio and written comments (Bilbro et al., 2013), additional research is needed to establish which features of formative feedback (e.g., amount, medium) are most critical in promoting student learning.

In addition, we have no way of knowing about the extent to which our findings might be the result of the novelty of the audio feedback. Possibly, the fact that this type of feedback was new to students resulted in them paying closer attention and, consequently, may explain improvements in their grades between the short report and final paper. Additional research is needed to establish whether continued use of audio feedback would result in students paying less attention and learning less about how to improve their performance.

## Conclusions

The results of the present study indicate that audio feedback is well received by students and that it can lead to grade improvements on later work, even when the subsequent assignment differs from the original in terms of its content. Such an approach to providing feedback on written work may be a useful addition to the options currently available for grading student papers, and may be particularly effective in cases where students or markers face challenges associated with text-based disabilities (e.g., dyslexia; visual impairments). We believe that it is a method that shows promise and should be explored further as a means of helping students to improve the standard of their written assignments.

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